Challenges and Opportunities in the Great Lakes Maritime Sector

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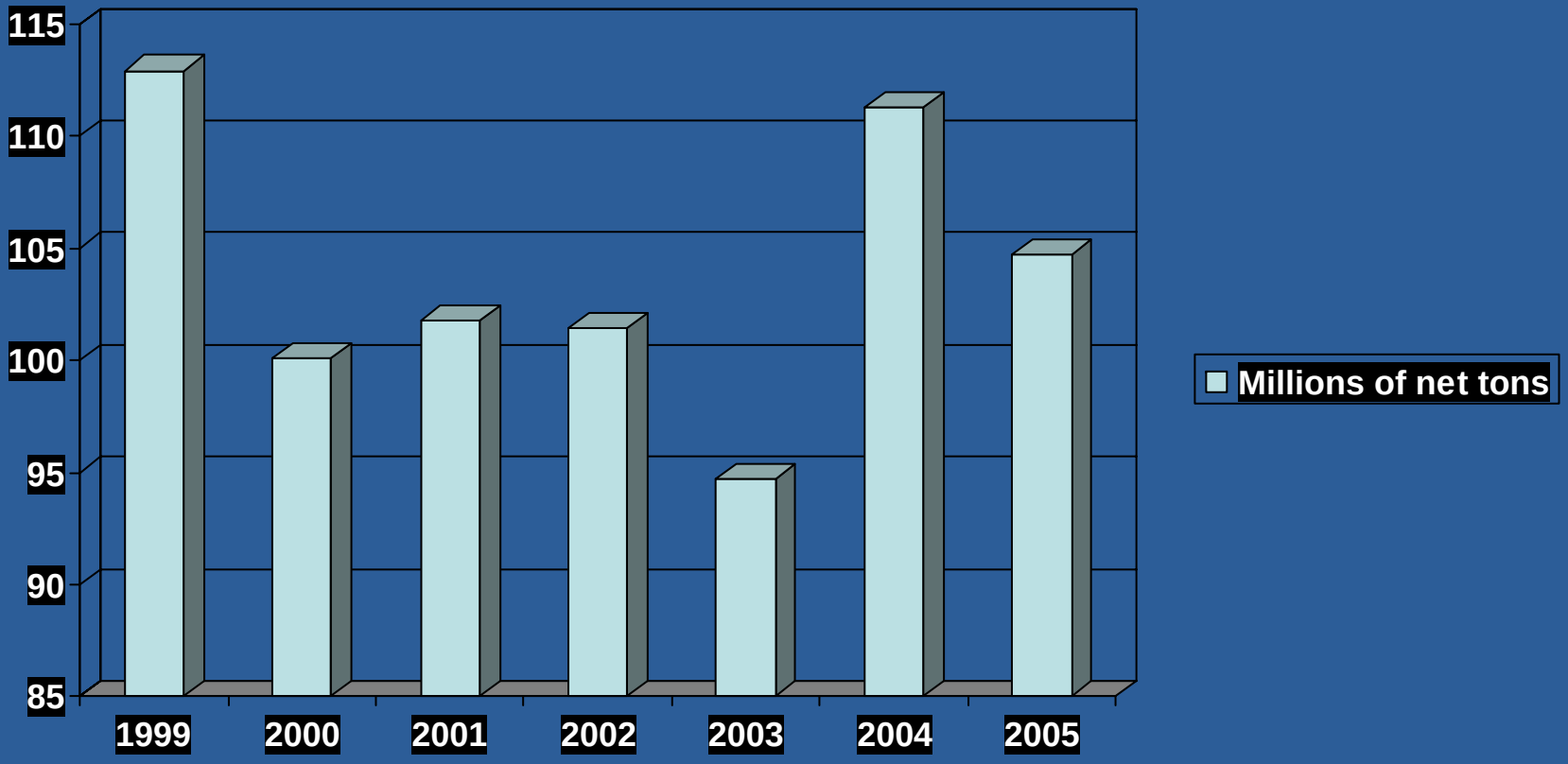
Challenges

- Survival in cyclic, competitive, and globally dynamic markets.
- Aging navigation infrastructure.
- Water levels and dredging needs.
- Ballast management for aquatic nuisance species.
- Growing attention to emission reduction.

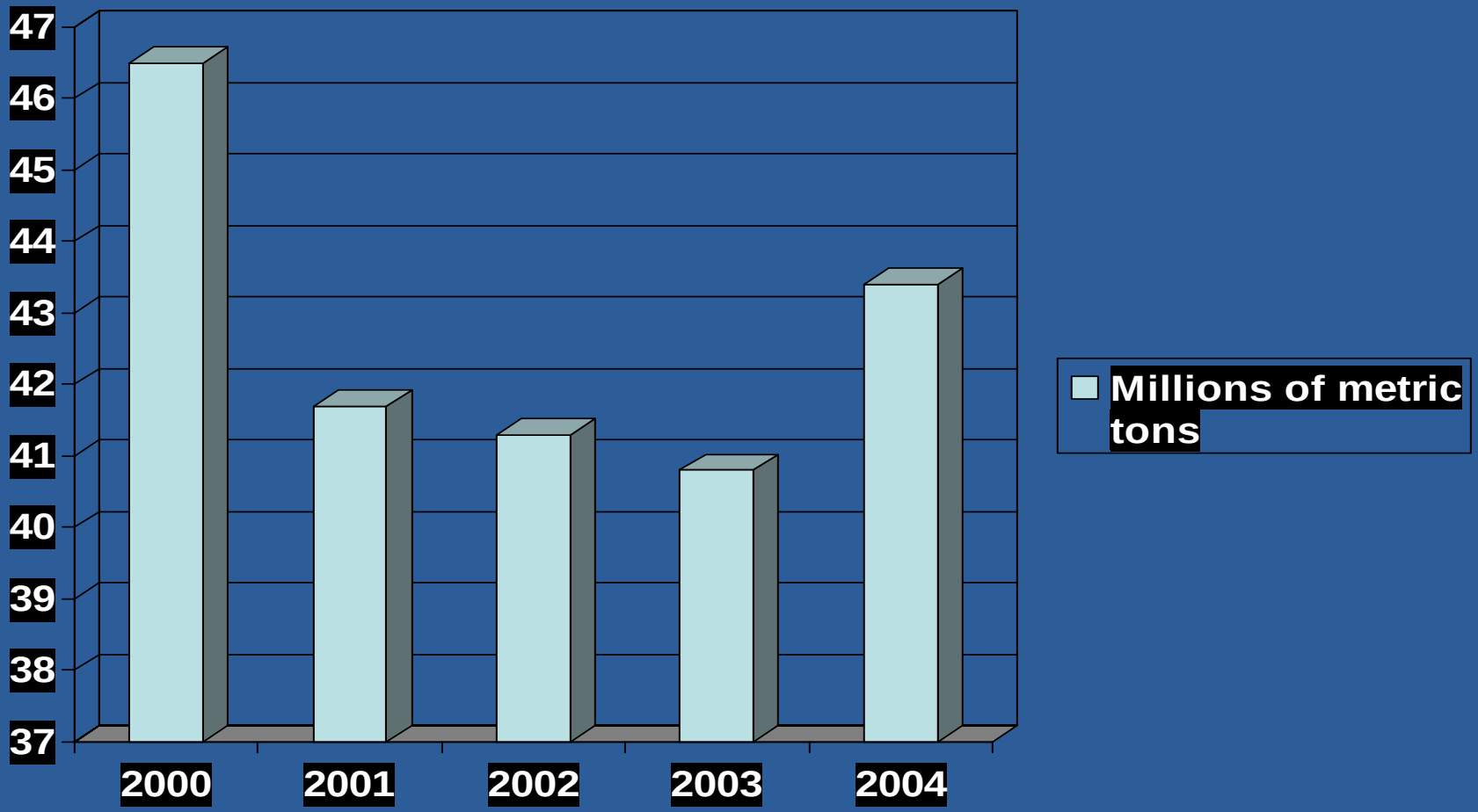
Opportunities

- Modal shift analyses continue to reflect environmental advantages of the marine transportation mode.
- The U.S. Marine Transportation System expects significant growth in volume.
- The Great Lakes/St. Lawrence system offers many short sea shipping routes, including cross-lake ferries.

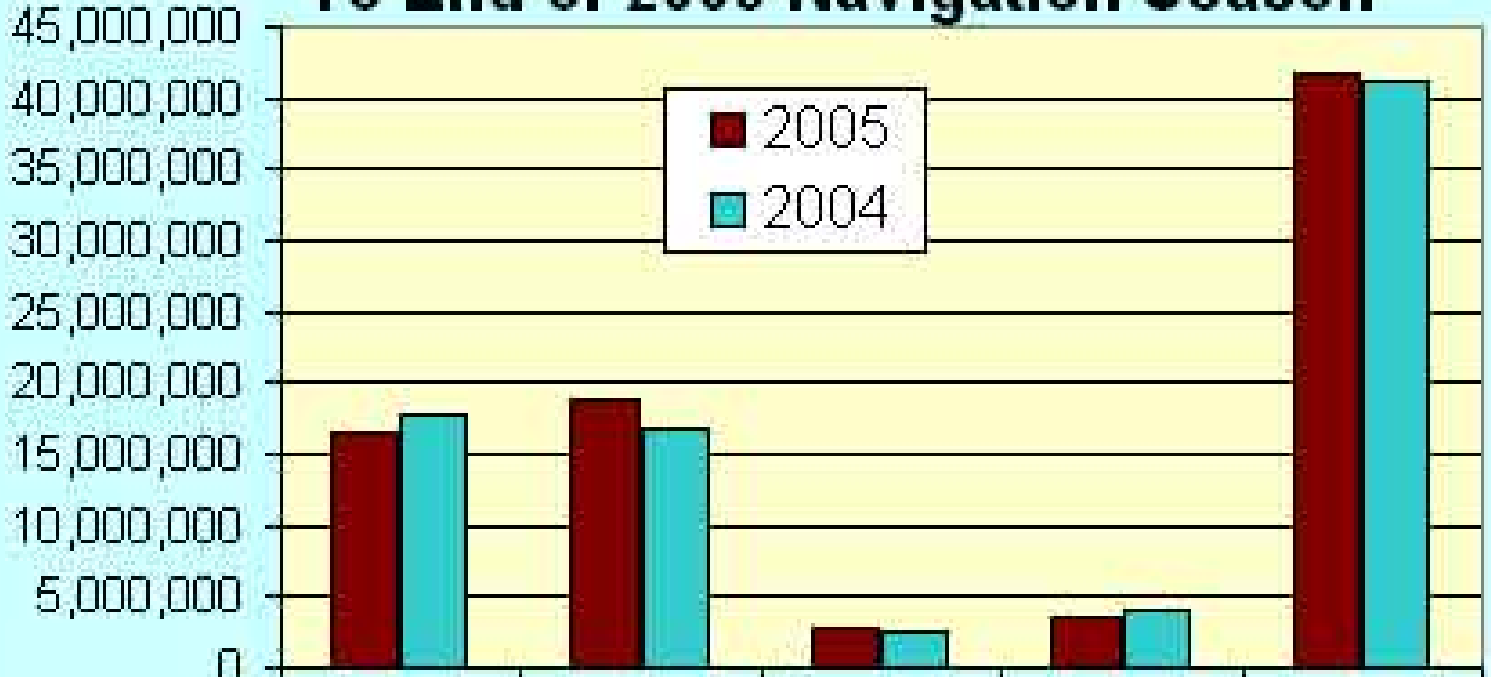
U.S. Flag Dry Bulk Cargo Carriage: LCA



St. Lawrence Seaway Traffic

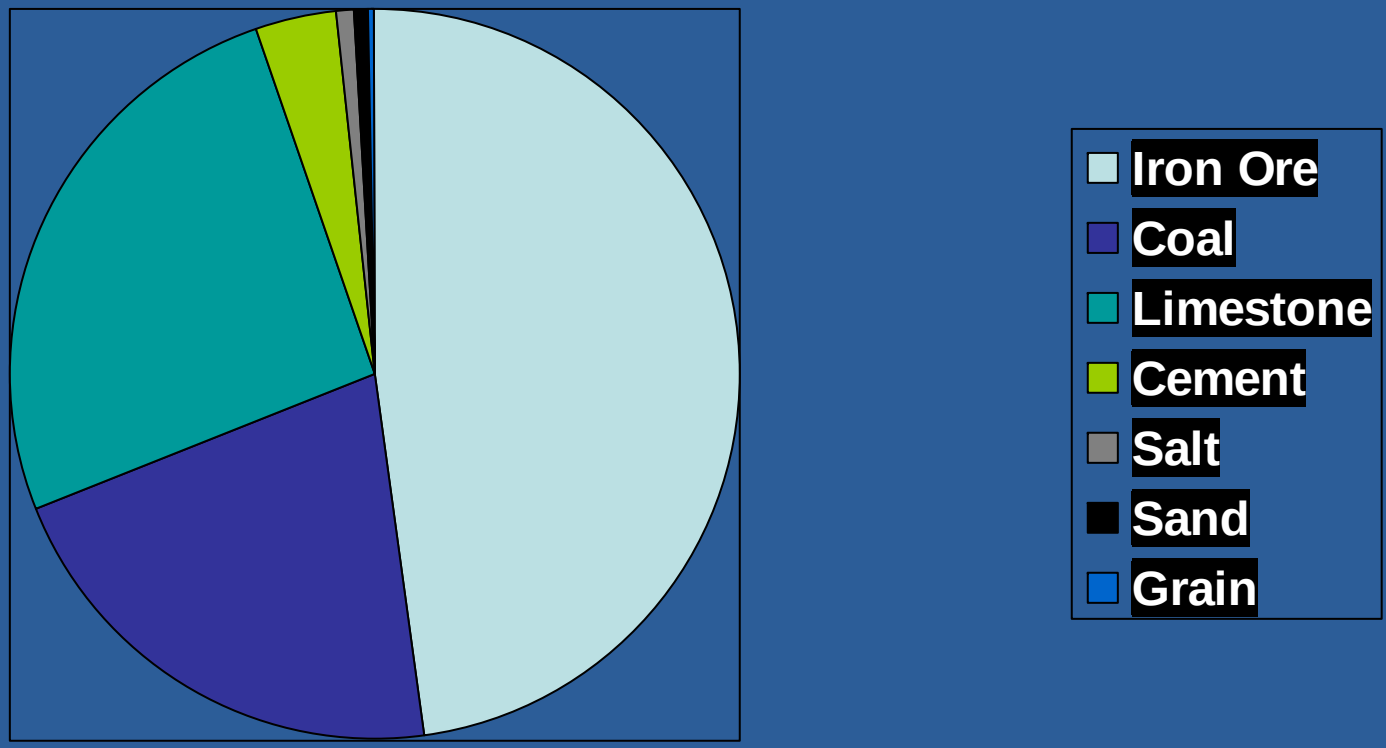


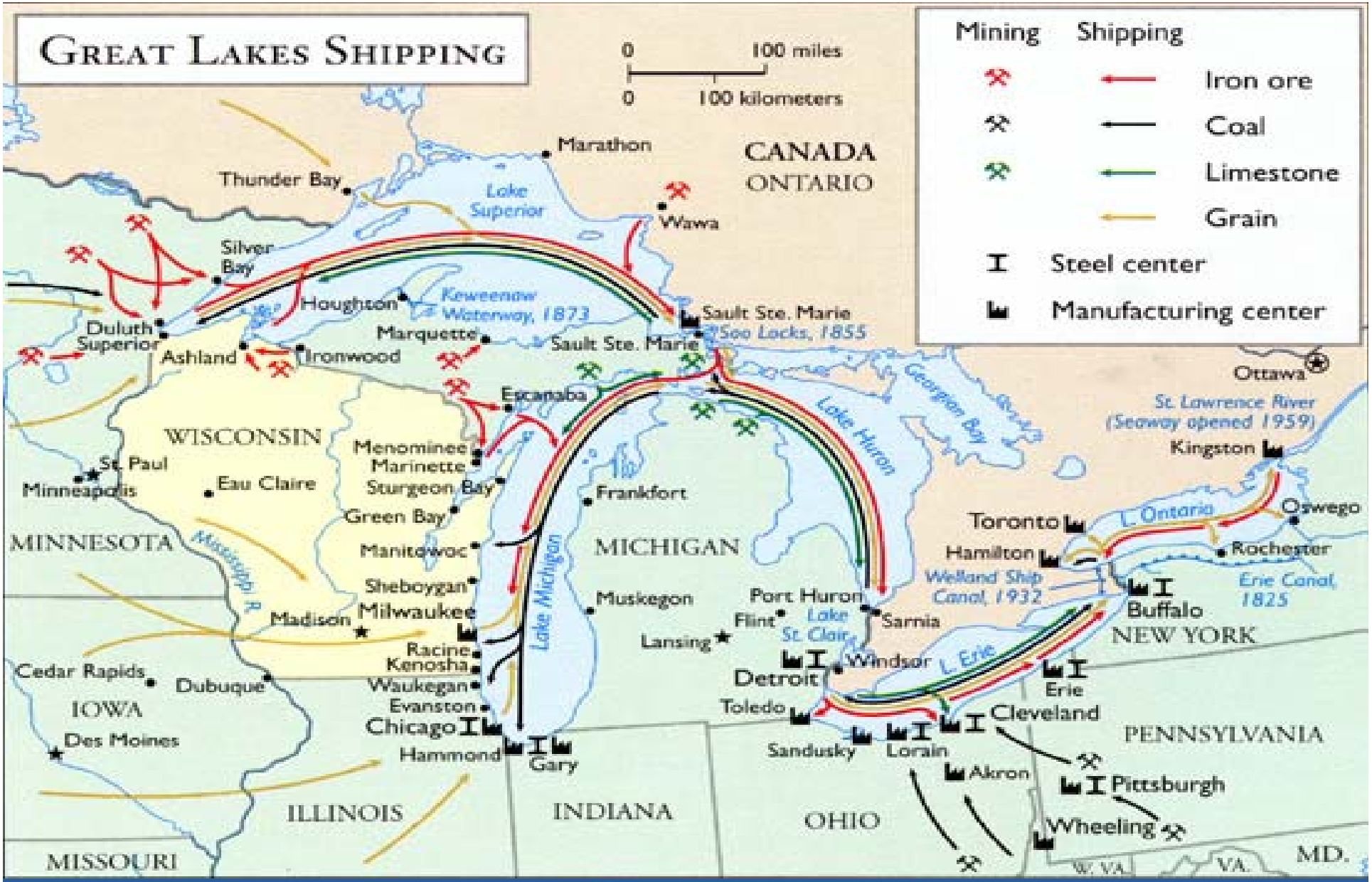
Duluth Superior Cargo Tonnage
To End of 2005 Navigation Season



	Iron Ore	Coal	Grain	Other	Total
2005	16,556,247	18,772,260	2,846,760	3,504,724	41,679,992
2004	17,854,550	16,659,538	2,545,109	4,114,401	41,173,597

U.S. Flag cargo: 2000-2005 average




GREAT LAKES SHIPPING
0 100 miles
0 100 kilometers
Mining
Shipping
Iron ore
Coal
Limestone
Grain
Steel center
Manufacturing center
CANADA
ONTARIO
Marathon
Thunder Bay
Lake Superior
Wawa
Silver Bay
Houghton
Keweenaw Waterway, 1873
Sault Ste. Marie
Soo Locks, 1855
Duluth
Superior
Ashland
Ironwood
Marquette
Sault Ste. Marie
Ottawa
Georgian Bay
Lake Huron
St. Lawrence River
(Seaway opened 1959)
Escanaba
WISCONSIN
Menominee
Marinette
Sturgeon Bay
Kingston
St. Paul
Minneapolis
Eau Claire
Frankfort
Green Bay
Toronto
L. Ontario
Oswego
MINNESOTA
Mississippi R.
Manitowoc
MICHIGAN
Hamilton
Rochester
Sheboygan
Muskegon
Port Huron
Welland Ship Canal, 1932
Erie Canal 1825
Madison
Milwaukee
Flint
Sarnia
Buffalo
Lake St. Clair
NEW YORK
Racine
Kenosha
Lansing
Windsor
L. Erie
Cedar Rapids
Dubuque
Waukegan
Detroit
Erie
IOWA
Evanston
Toledo
Cleveland
Chicago
PENNSYLVANIA
Des Moines
Hammond
Gary
Sandusky
Lorain
Akron
Pittsburgh
ILLINOIS
INDIANA
OHIO
Wheeling
MISSOURI
W. VA.
VA.
MD.

25 years ago:

- There were 17 integrated steel companies served by Great Lakes vessels.
- There were 22 major fleets on the Lakes.

Today:

- There are 8, with Mittal and USX the most dominant.
- There are 11, soon to be 10.

Aging infrastructure

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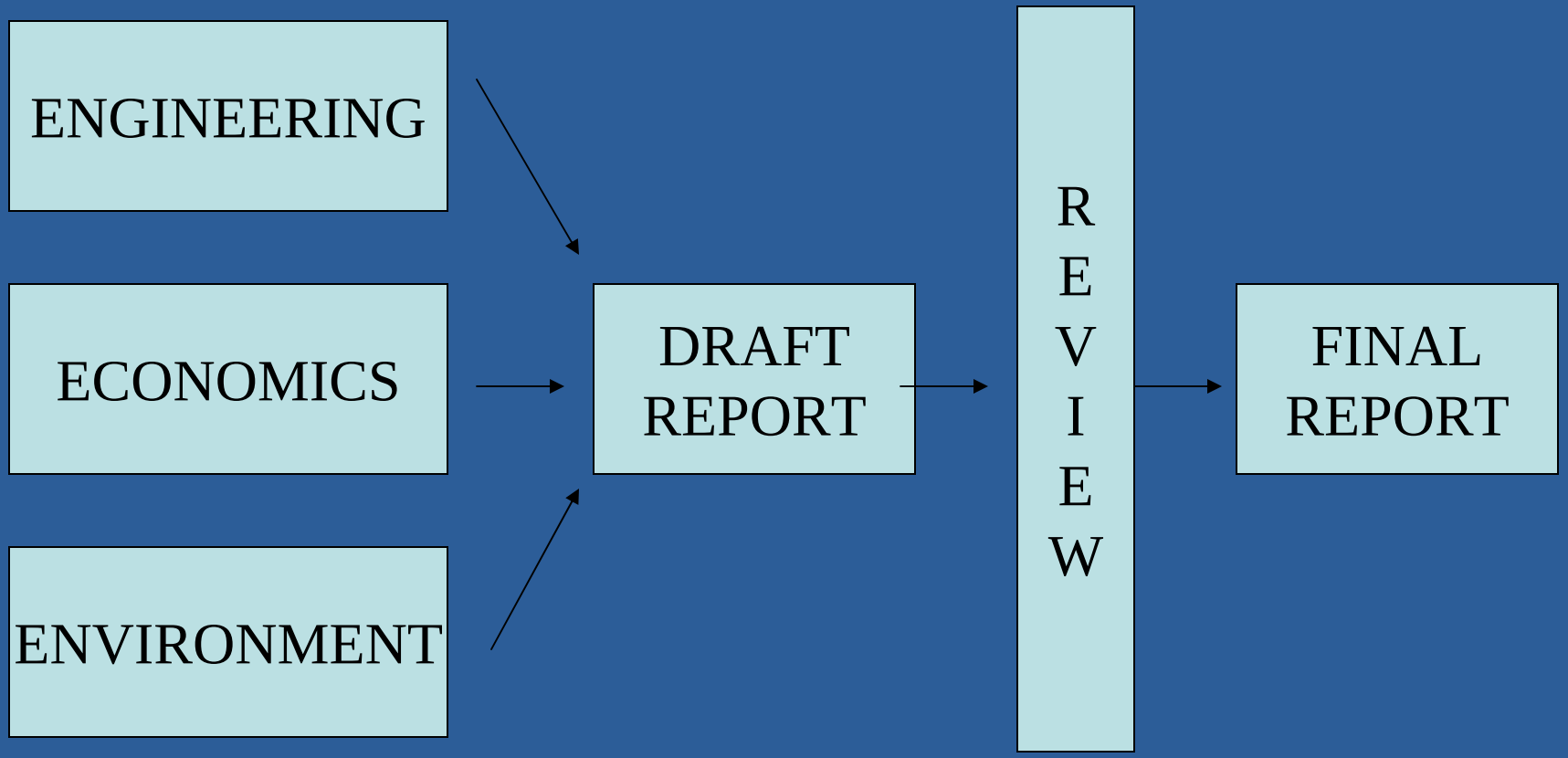
GL/Seaway Study Work Scope



Soo Locks Replacement Project

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Great Lakes dredging:

3 to 5 million cubic yards per year

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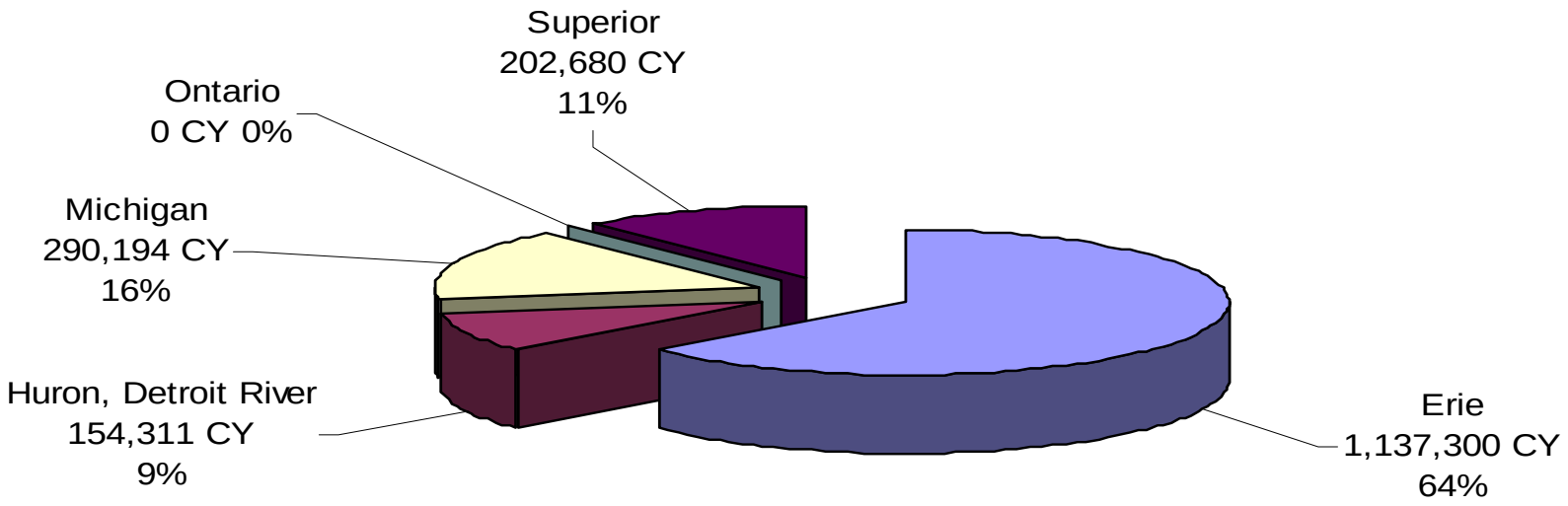
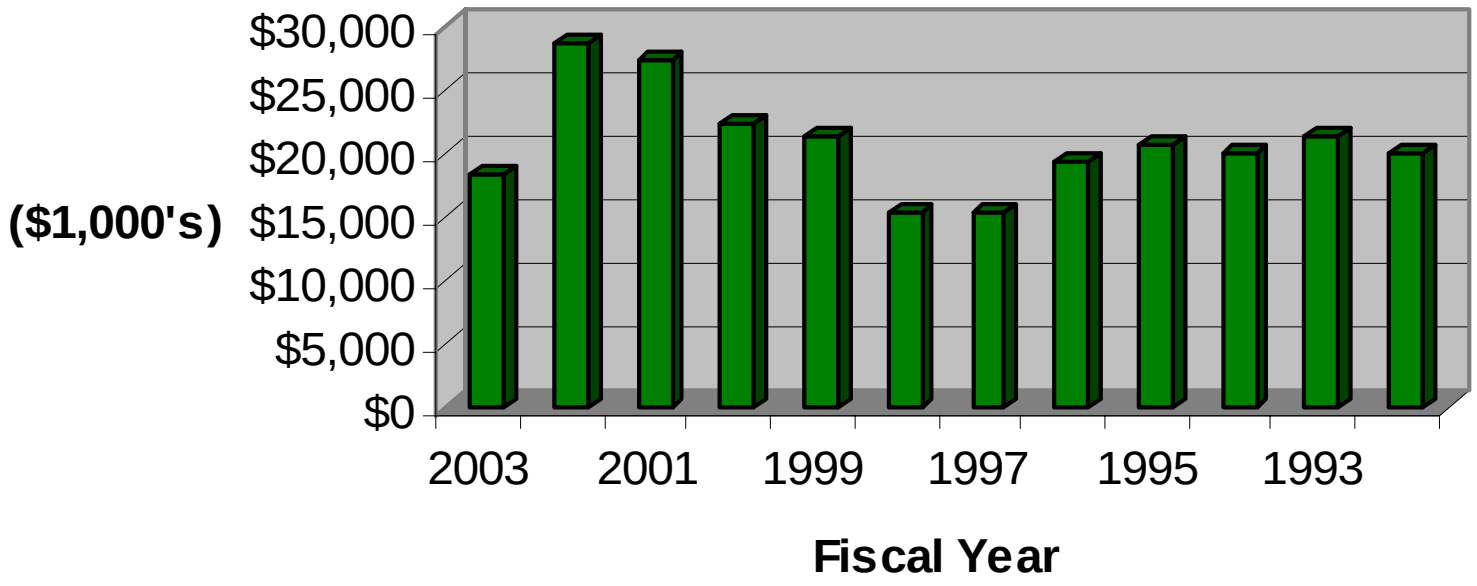
Dredging activity by lake: 2004



Great Lakes Dredging Expenditures



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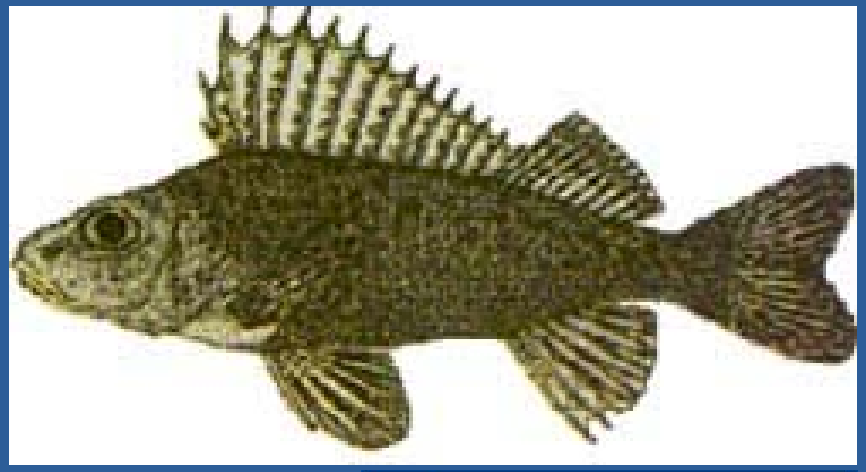
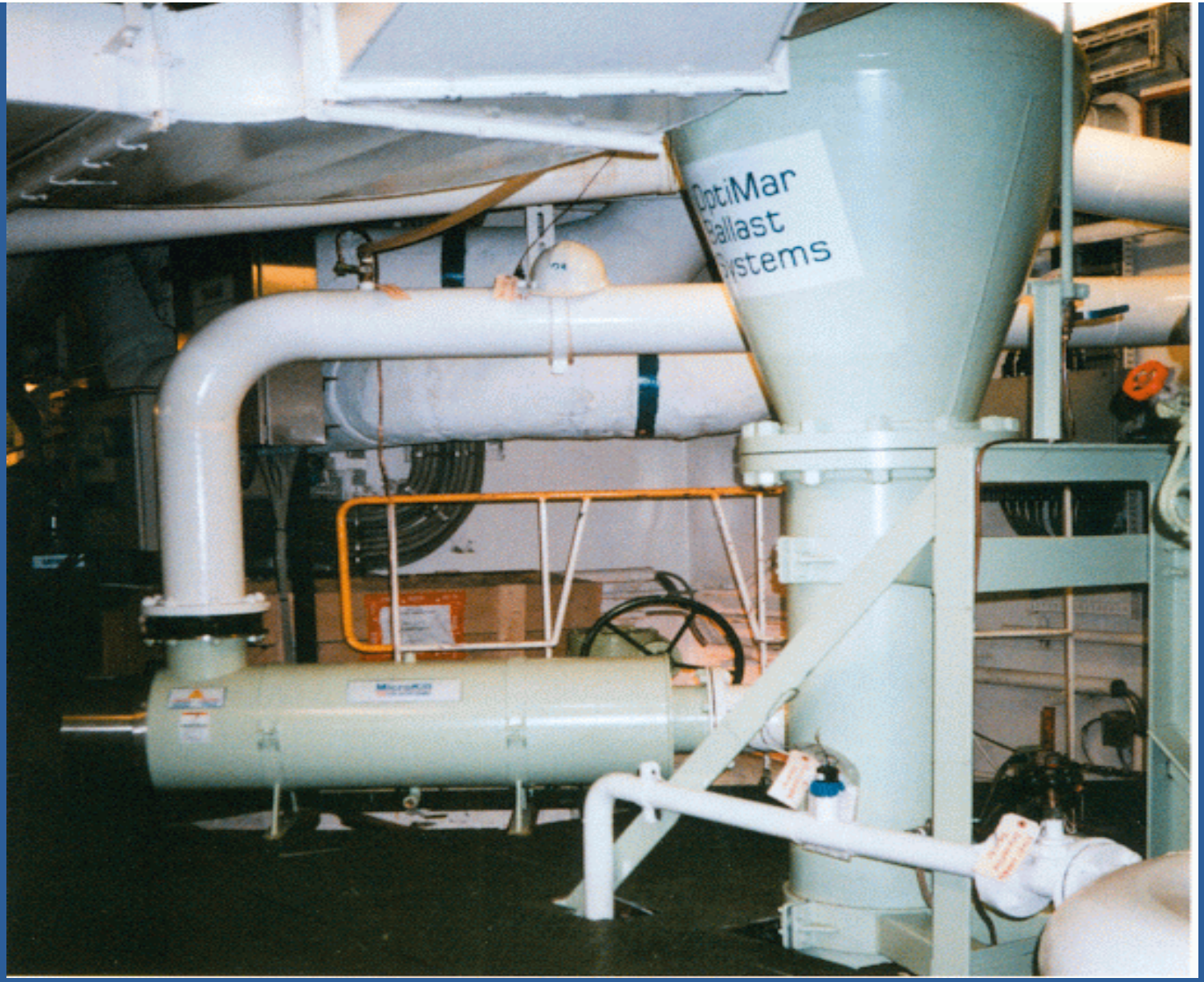
ANS: Suspected ballast borne species





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Coming in 2006

Oceansaver Ballast Water Treatment System

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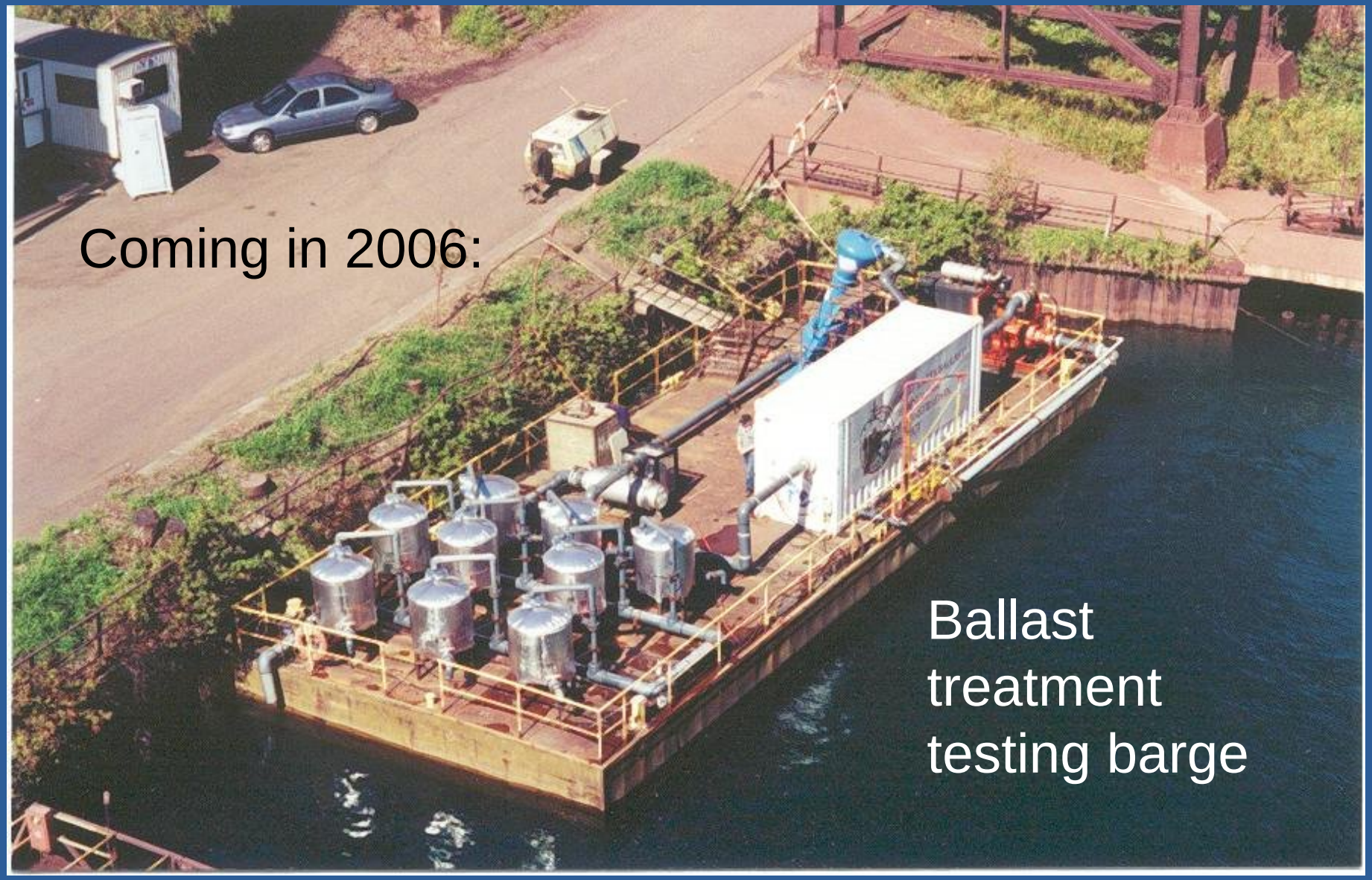

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California Court: Clean Water Act applies to ballast operations

- Every discharge will need a permit
- State departments will get involved
- All discharges will be regulated
- Public input will be solicited
- New reporting regulations will be in place
- Operators will be subject to citizen suits

Air emissions: Vessel and Port Operations

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"Air pollution is a problem. Ten or 15 years ago, shipping could claim, with every justification, that in terms of atmospheric pollution, it was THE clean transport industry. But as time has passed, other transport modes have been forced to improve their air emission standards, while the shipping industry seems to have rested on its laurels."

Christopher Horrocks, Secretary General, International Chamber of Shipping

MARPOL Annex VI

- Sets limits on sulfur oxide and nitrogen oxide emissions from ship exhausts and prohibit deliberate emissions of ozone depleting substances.
- Provides for Sulfur Emission Control Areas (SECAs) in which lower sulfur limits can be adopted.

MARPOL Annex VI

- Shipping industry argued for lower sulfur content in bunker fuel, 3%.
- Governments with oil industry interests prevailed: maximum sulfur content is 4.5%.

“Environmental Impacts of a Modal Shift”

Minnesota Department of Transportation – Ports and Waterways Section, 1991

- Reviewed four commodity movements on Minnesota’s river and Great Lakes transportation system.
- A shift to trucks would cause a 709% increase in exhaust emissions annually.
- In two corridors where rail is possible, emissions jump by 470%.

“Great Lakes and St. Lawrence River Commerce: Safety, Energy and Environmental Implications of Modal Shifts”

Great Lakes Commission, 1993

- Potash from Thunder Bay to Toledo
- Coal from Superior to St. Clair, MI
- Taconite from North Shore to Lorain
- Cement from Alpena to Detroit
- Petroleum from Sarnia to Montreal
- Petrochemicals from Sarnia to Chicago
- Grain from Thunder Bay to Quebec City
- Paper products from Thunder Bay to Superior
- Iron ore from Sept Iles to Hamilton
- Coal from Sandusky to Hamilton
- Steel from Rotterdam to Cleveland (alt. through Baltimore)

GLC Modal Shift Findings

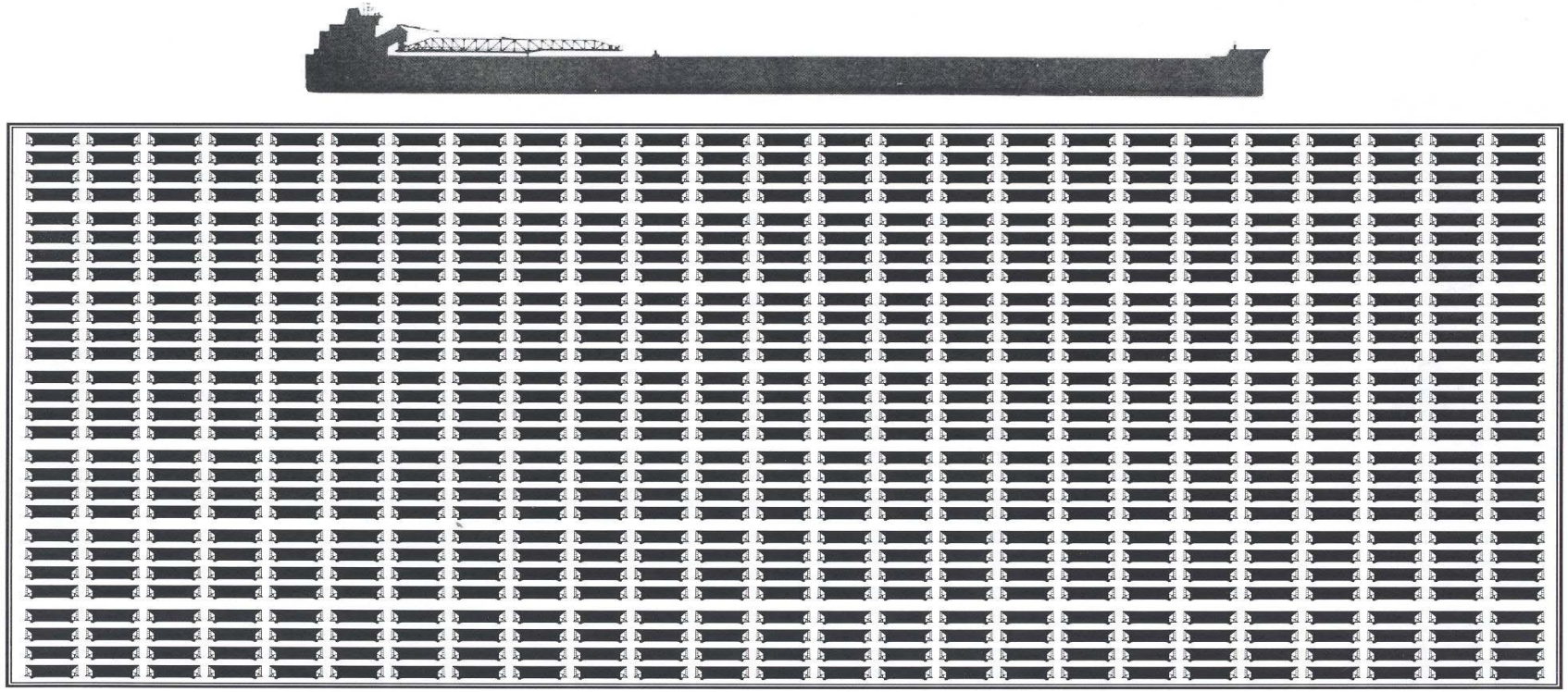
- Shifting 24.7 million tons of cargo from vessel to rail would result in additional consumption of 14 million gallons of fuel.
- Same shift would generate an extra 4,321 tons of carbon monoxide, hydrocarbon and nitrogen oxides pollutants.
- In scenarios with trucks, shifting 1 million tons would increase fuel use by 3.4 million gallons and generate an additional 570 tons of air pollutants.

Relative modal factors

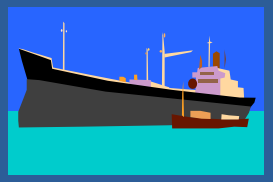
Chamber of Maritime Commerce, 2006

	Marine Factor	Marine Index	Rail Index	Truck Index
Energy	130 kjoule/t-km	1.0	2.2	9.7
Emissions	15.73 g/t-km	1.0	1.4	7.6
Accidents	.026/100M t-km	1.0	13.7	74.7
Spills	.008/100M t-km	1.0	10.0	37.5
Noise	66 dB	1.0	1.4	1.3

IN ONE TRIP, A 1,000-FOOT-LONG GREAT LAKES SELF-UNLOADER CARRIES THE EQUIVALENT OF SEVEN 100-CAR UNIT TRAINS



= 100 NET TONS PER RAILROAD CAR



1 SHIP = 2,800 TRUCKS

 . = 25 tons per truck

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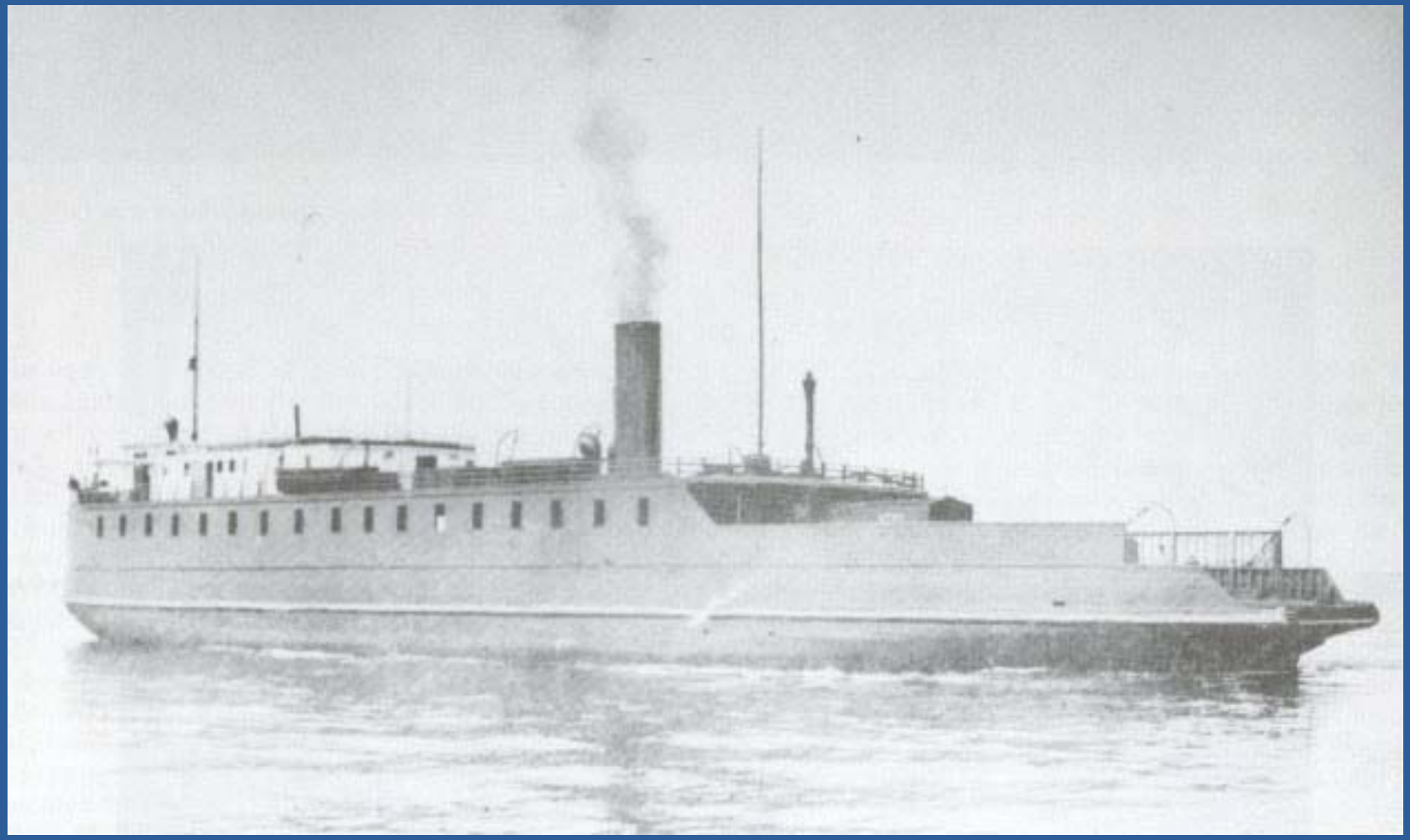
Cross-lake ferries: Not a new concept

Ann Arbor No. 1



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Aquarama

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Milwaukee Clipper


Annex 2
Ferry Routes
South Baymouth
Alpena
Manitowoc
Ludington
Milwaukee
Muskegon
Chicago
St. Joseph
Toronto
Oswego
Rochester
Niagara
Port Dover
Port Stanley
Erie
Cleveland

Badger

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Spirit of Lake Ontario

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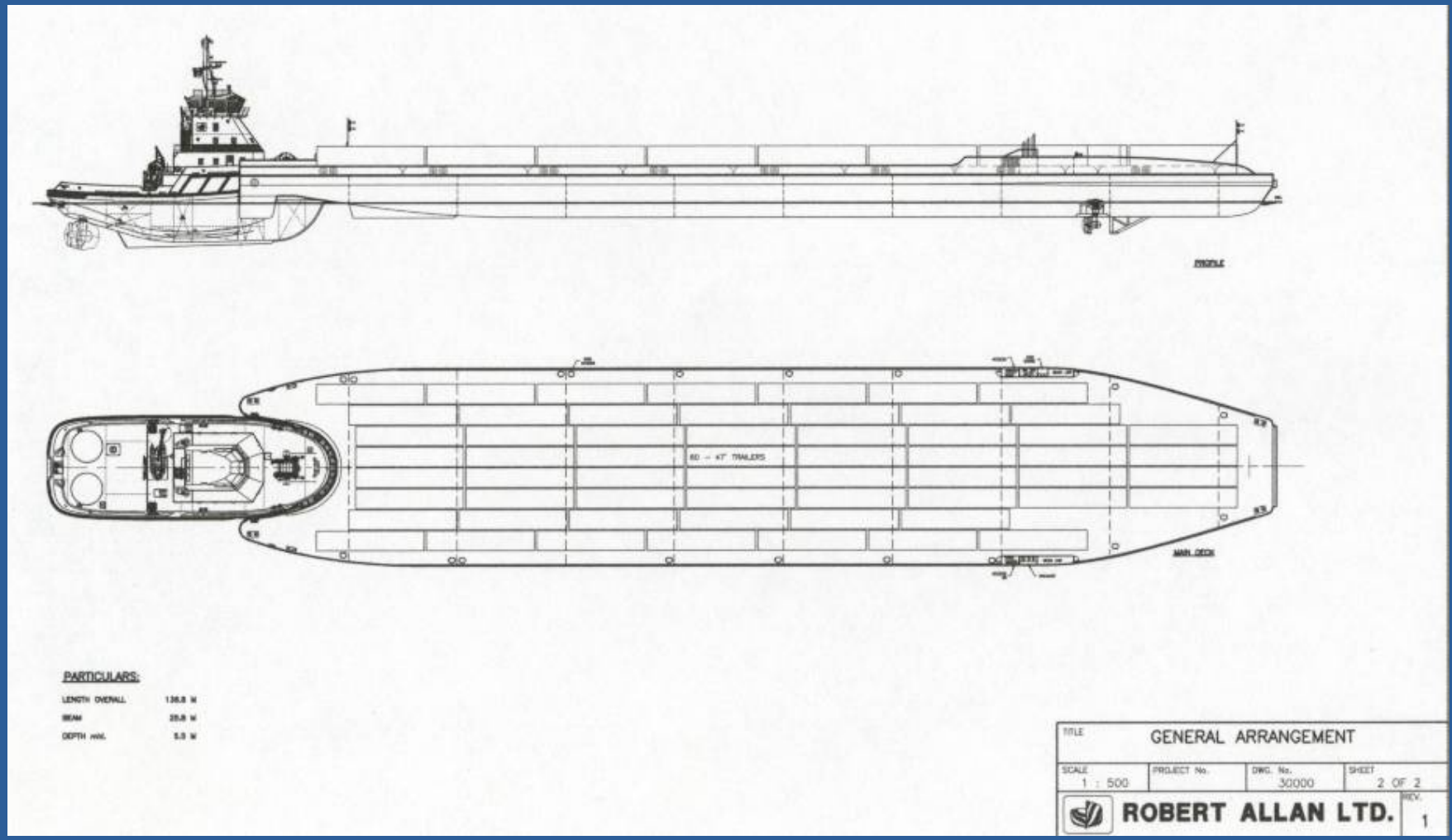

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Factor: Harbor Maintenance Fee

- Currently at .125% of value on U.S. imports
- Major impact on freight ferries where duty can be up to $130 a truck load
- *Incan Superior* cargoes were being billed at up to $160,000

The future for bulk cargos: more ITBs

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Short Sea Shipping

- Already a Great Lakes specialty
- Designed specifically to ease pressure on stress rail and highway corridors
- New cargos in niche markets
- Entry into distribution chains

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